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ABSTRACT. Objective: The goals of the present study were to (a) examine change in rates of problem alcohol/substance use among a sample of veterans between their last year of military service and their first year following separation, (b) identify predictors of continued problem use in the first year after separation, and (c) evaluate the hypothesis that avoidant coping, posttraumatic stress disorder (PTSD) symptoms, and chronic stress place individuals at particularly high risk for continued problem use. **Method:** Participants (N = 1,599) completed self-report measures before and during the year following separation. Participants who endorsed either having used more than intended or wanting or needing to cut down during the past year were considered to have problem use. **Results:** Of 742 participants reporting problem substance use at baseline, 42% reported continued problem substance use at follow-up ("persistors"). Persistors reported more trouble adjusting to civilian life, had a greater likelihood of driving while intoxicated, and had a greater likelihood of aggression. Multivariate analyses showed that avoidant coping score at baseline and higher PTSD symptom score and greater sensation seeking at follow up predicted continued problem use. **Conclusions:** Understanding risk factors for continued problem use is a prerequisite for targeted prevention of chronic problems and associated negative life consequences. (*J. Stud. Alcohol Drugs, 75,* 557–566, 2014)

THE INSTITUTE OF MEDICINE (IOM) recently characterized military substance misuse as a "public health crisis" (IOM, 2012). This designation stems largely from problem use of alcohol, which is highly prevalent among U.S. military service members (Wilk et al., 2010). Problem use can include misuse, functional problems attributable to substance use, difficulty controlling use or difficulty cutting down, and substance use disorders (e.g., Bray et al., 2009; IOM, 2012; Wilk et al., 2010). More than 25% of service members ages 18–25 years screen positive for problem alcohol use compared with about 16% of demographically matched civilians (Bray et al., 2009). Moreover, rates of reported heavy drinking among military personnel rose more than 25% from 1998 to 2008 (Bray et al., 2009), representing an alarmingly rapid surge. In addition, 12% of military personnel endorsed illicit substance misuse, including misuse of prescription drugs (IOM, 2012). Unfortunately, comparisons to substance misuse in previous years were not recommended (IOM, 2012) because of changes in item wording from previous questionnaires.

Among samples from the general population, the pattern of drinking and other substance use is such that heavy use generally peaks in young adulthood and then decreases over time, presumably as individuals take on more adult roles and career responsibilities. Only a small subset exhibit continued problem use further into adulthood (Marlatt et al., 1993; Substance Abuse and Mental Health Services Administration, 2009). This phenomenon is often referred to as "maturing out" (Ham and Hope, 2003; Zucker, 1987). If a process similar to the maturing out phenomenon is also true of young service members, one would expect a peak in alcohol and other substance use during military service in early adulthood followed by a large decrease in the numbers of senior personnel and veterans with problem use as individuals continue to age. In fact, Bray and colleagues' (2009; IOM, 2012) data comparing military and civilian rates of alcohol and other substance use confirm that use of both alcohol and other substances is highest among the youngest portion of their samples (ages 18–25) and steadily declines among older age groups. However, although young active-duty personnel (ages 18–35) were more likely to drink heavily than civilian counterparts, they were less likely than civilian counterparts to use illicit substances. On the other hand, older active-duty personnel (ages 36–64) were significantly more likely than civilian counterparts to use illicit substances, but only when prescription medications were included as an illicit substance.

It is also noteworthy that separation from the military may curtail important drinking motivations. For example,

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it has been argued that, "The higher rates of heavy drinking among younger military personnel compared with their civilian counterparts suggest that norms and expectations of military life may encourage heavy drinking" (IOM, 2012, p.43). Consistent with this hypothesis, problem drinkers in the military often cite social reasons for drinking. Across all military services, almost half of all heavy drinkers consume alcohol for social reasons, whereas just 17% of light drinkers cite social motivations for drinking (Brown et al., 2007). Another consideration is that alcohol is inexpensive and easily available on most military bases in the United States (IOM, 2012). Taken together, these factors both partially explain the high rates of problem use found among young service members and increase the likelihood of cessation among those "transitioning out" of military cultural norms. However, to our knowledge, no previous study has documented the proportion of problem drinkers in the military who cease abusing alcohol and/or other substances after transitioning back into civilian life.

Still, high rates of problem use among Department of Veterans Affairs patients (Baker et al., 2009) suggest that, as with civilians, some veterans continue problem use of alcohol or other substances into midlife and beyond. Understanding characteristics of this subset is crucial given the numerous problems associated with continued problem use. Adverse psychiatric outcomes associated with problem use of alcohol among veterans include greater severity of symptoms, such as nightmares (Gellis et al., 2010), anger and hostility (Elbogen et al., 2010), and posttraumatic stress disorder (PTSD) symptoms (Widome et al., 2011). In addition, veterans with problem use of alcohol show greater functional difficulties, including worse occupational functioning (Erbes et al., 2011), increased medical disease burden (Possemato et al., 2010), and lower quality of life (Erbes et al., 2007). Problem use of alcohol and other substances is a key risk factor for homelessness among veterans (Edens et al., 2011). Particularly concerning, problem substance use among veterans is associated with greater suicide contemplation (Pietrzak et al., 2010) and greater mortality (Bohnert et al., 2012), thus potentially putting a veteran's life at risk through multiple pathways.

In the civilian maturing-out literature, several risk factors for continued problem alcohol use past the young adult years have been identified (e.g., Ham and Hope, 2003). These include avoidant coping styles (Cloninger et al., 1995), inability to obtain full-time employment (Gotham et al., 1997), heavy drinking when alone (e.g., Christiansen et al., 2002), family history of alcoholism (Jackson et al., 2001), sensation-seeking personality styles (Cloninger et al., 1995), hostility (Costanzo et al., 2007), and symptoms of depressive or anxiety disorders (Baer, 2002; Kushner et al., 1999). Studies of veteran samples have also identified posttraumatic distress (Widome et al., 2011) and greater severity of combat exposure (Hassija et al., 2012) as predictors of problem alcohol use.

Avoidant coping, defined as responding to challenging situations and negative emotions by distancing oneself through cognitive and behavioral avoidance strategies (Litman, 2006; Pietrzak et al., 2011; Roth and Cohen, 1986), has also been identified as a possible mechanism underlying alcohol use across various samples, including service members (Widome et al., 2011). One survey of military personnel indicated that almost a quarter of heavy drinkers consumed alcohol as a way to deal with stress (Brown et al., 2007). A recent study showed that college students who were veterans were more likely to drink for avoidant coping reasons than were nonveteran students (Barry et al., 2012). These studies highlight the need to better understand the influence of avoidant coping on chronic alcohol use, and possibly other substance use, in past and present military personnel. This style of coping may impede alcohol cessation among military and veterans because withdrawal symptoms may prime negative emotions that, in turn, trigger urges to renew drinking (Baker et al., 2004).

Adding to the complexity of the relationship between avoidant coping and alcohol/other substance problem use, avoidant coping has also been found to be a correlate and predictor of PTSD severity (Benotsch et al., 2000; Glass et al., 2009; Pietrzak et al., 2011; Tiet et al., 2006), whereas PTSD severity has been found to be a predictor of continued drinking (Widome et al., 2011). Benotsch and colleagues (2000) assessed Gulf War veterans approximately 2 and 3 years following deployment. Avoidant coping at Year 2 predicted PTSD diagnostic status and severity at Year 3. In a sample of 251 motor vehicle accident survivors, avoidant coping was a stronger predictor of posttraumatic stress symptoms among those with a history of alcohol use problems than those without (Hruska et al., 2011), suggesting that avoidant coping may be a link between substance use disorder and PTSD comorbidity.

The relationship between avoidant coping, PTSD, and alcohol/other substance use problems may be understood in the context of the stress coping model of substance use. This model posits that stress avoidance via alcohol use may be successful in the short term but may promote dependence over longer periods (Hasking et al., 2011; Kassel et al., 2007; Wagner et al., 1999). This suggests that military personnel who use alcohol and other substances to relieve stress are at heightened risk for continued problem use if postmilitary life is also stressful. Thus, although it may be somewhat normative for young service members to exhibit problem use of alcohol during social activities, those using alcohol to cope with symptoms of PTSD, other chronic stress, or negative affect may be at risk for long-term alcohol problems.

Identifying military substance users who are at risk for continued problem use in civilian life is crucial. Such knowledge is a prerequisite for targeted prevention of continued problems and associated negative life consequences.

The goals of the present study were to (a) examine change in rates of alcohol/other substance problem use among a sample of veterans between their last year of military service and their first year following separation from the military, (b) identify predictors of continued problem use in the first year after separation, and (c) evaluate the hypothesis that avoidant coping, PTSD symptoms, and chronic stress place individuals at particularly high risk for continued problem use.

Method

Participants

Study participants were service members recruited from mandatory pre-separation Transition Assistance Program workshops at 13 military installations (7 Navy, 6 Marine Corps). Service members attending Transition Assistance Program workshops were preparing to leave active service. The primary reasons for separation were end of obligated service term and retirement, respectively. Participants were eligible for inclusion in this study only if they completed both the baseline and follow-up surveys. Of 6,352 service members completing the baseline survey, 1,599 (25.2%) also completed the follow-up survey. The response rate may be an underestimation as a large number of participants who completed the baseline survey were ineligible for the follow-up or were not locatable. More specifically, data collected from a large subsample (n = 3,755) of baseline participants indicated that 17% were ineligible (i.e., did not separate) and/or not locatable at the time of follow-up. However, because these data were not collected for the full sample, we report the more conservative response rate.

Procedures

Surveys were administered as part of a longitudinal study designed to examine the experiences of Navy and Marine Corps personnel transitioning from active duty to civilian life. Study recruitment was completed in two waves between September 2007 and April 2010. After providing written consent, subjects completed the baseline survey, which included a space to enter contact information for future surveys. Participants who provided addresses were contacted via postal and electronic mail approximately 9–12 months later and invited to complete either a paper or an electronic version of the follow-up survey. Those still on active duty were disqualified. Study procedures were approved by the Naval Health Research Center Institutional Review Board.

Measures

Dependent variable. Problem substance use was measured at baseline and follow-up with the two-item conjoint screen (TICS; Brown et al., 2001). Validity testing has shown that the TICS can identify substance use disorders with close to 80% sensitivity and specificity (Cottler et al., 1989; Janca et al., 1992). On the baseline survey, participants in the first data collection wave answered "yes" or "no" to the following items: "In the past year, have you ever drunk alcohol or used drugs more than you meant to?" and "Have you felt you wanted or needed to cut down on your drinking or drug use in the past year?" In the second wave of baseline data collection, references to drug use were omitted from the TICS because of a Navy Institutional Review Board directive. Therefore, the second wave of baseline surveys included TICS items asking about alcohol use only. To ensure that the change in item wording did not significantly alter the distribution of responses or predictive modeling results, all regression models were run separately for each survey wave as well as on the full sample. Comparison of these analyses revealed that there were no significant differences between survey waves, and therefore the full sample was used. On the follow-up survey, participants from both waves answered "yes" or "no" to the following items: "Since leaving the military, have you ever drunk alcohol or used drugs more than you meant to?" and "Have you felt you wanted or needed to cut down on your drinking or drug use since leaving the military?"

Given that the objective of the current study was to assess predictors of decreased substance use, only participants who answered "yes" to at least one item on the TICS at baseline were included in the analyses (n = 742). These participants were then classified into two groups based on follow-up substance use status. Participants who answered "no" to both follow-up TICS items were classified as "decreasers," and those responding "yes" to at least one follow-up item were classified as "persistors" in agreement with Lee et al.'s (2012) nomenclature for alcohol use trajectories in young adults. Also, to explore the external validity of the substance use categories, behavioral correlates (e.g., drinking and driving) were examined.

Independent variables. PTSD symptoms were measured at baseline and follow-up with the 17-item PTSD Checklist–Civilian Version (PCL-C; Weathers et al., 1994). PCL-C items are consistent with the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (American Psychiatric Association, 1994), criteria for PTSD. Participants rate on a scale from 1 (*not at all*) to 5 (*extremely*) how much they felt bothered by symptoms over the previous month. All responses were summed to create a total scale score (α = .949).

Mental health–related limitations were measured at baseline and follow-up with a single item asking, "During the past 30 days, how often did poor mental health keep you from doing your usual activities, such as work or recreation?" Responses were recoded into three categories: 0–3 days, 4–10 days, and 11–30 days.

Work- and family-related stresses were measured at follow-up with scales derived from the 2008 Department

of Defense (DoD) Survey of Health Related Behaviors (HRB) Among Active-Duty Military Personnel (Bray et al., 2009). The original scale assessed sources of stress among service members and comprised 21 items related to work, family, and general life stress. We used items identified in an exploratory factor analysis to capture work stress and family stress. The work stress scale comprised five items reflecting participants' perceived amount of stress since separation because of such work-related issues as "problems in my relationships with the people I work with," "concern about my performance rating," and "increases in my work load." Family-related stress was measured with a nine-item scale that assessed participants' stress level since separation regarding family-related issues, including "having a baby," "divorce or break up," and "death in the family." Response options ranged from 1 (*none at all*) to 4 (*a lot*). Responses were summed to compute a total scale score for each subscale (α = .713 for work stress and .647 for family stress).

Avoidant coping was assessed at baseline with three items from the DoD HRB Coping with Stress Scale (Bray et al., 2006). The items asked how often participants engaged in certain activities when "pressured, stressed, depressed, or anxious" (1 = *never,* 2 = *rarely,* 3 = *sometimes,* 4 = *frequently*). The scale items were "light up a cigarette," "have a drink," and "get something to eat," and responses were summed to acquire a scale score.

Social support was measured at follow-up with a modified version of the Postdeployment Social Support Scale from the Deployment Risk and Resilience Inventory (King et al., 2003). The original scale was adapted to assess current level of social support with 12 items measuring participants' support from friends, family members, and coworkers. Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*), and all items were summed to compute a scale score (α = .862).

Sensation seeking was measured at follow-up with four items assessing how well each statement described the respondent, including "I go for the thrills in life when I get a chance" and "I like to experience new and different sensations" (Cherpitel, 1993). Response options ranged from 1 (*not at all*) to 4 (*quite a lot*) and were summed to derive a total score (α = .910).

Postseparation behavioral outcomes were measured with three individual items. Trouble adjusting to civilian life was assessed with a single item, "How much trouble have you had adjusting to civilian life?" with response options ranging from 1 (*none at all*) to 4 (*a lot*). For analysis, the responses were dichotomized into 0 (*none at all*) and 1 (*a little–a lot*). Driving while intoxicated was assessed with a single four-point item, "Since leaving the military, did you drive a car or other vehicle when you had too much to drink?" Participants reported the frequency of the behavior, with response options of 1 (*never*), 2 (*once*), 3 (*2–3 times*), and 4 (*more than 3 times*). For the purpose of analysis, response options were dichotomized into 0 (*never*) and 1 (*1 or more times*). Aggression was measured with a single "yes" or "no" item, "Since leaving the military, I have lost my temper and hurt another person."

Covariates

Demographics and service characteristics included age, ethnicity, marital status, branch of military service, and time since separating from the military. Combat history was assessed with two variables, number of combat deployments and combat exposure. Number of combat deployments was assessed with a single item asking, "How many combat deployments have you been on in your military career?" Responses were collapsed into three categories (0, 1, and 2 or more). Combat exposure was measured with a 17-item scale derived from previous combat exposure research (Hoge et al., 2004; Keane et al., 1989; Maguen et al., 2004) that has been used in studies with Operation Iraqi Freedom/Operation Enduring Freedom veterans (Bray et al., 2009; Stander et al., 2011). This scale was selected because it captures the types of combat experiences common in Operation Enduring Freedom and Operation Iraqi Freedom conflicts. The scale assessed frequency of exposure to specific combat situations during the participants' most recent deployment. Sample items included, "I saw dead bodies or human remains" and "My unit suffered causalities." Item response options were on a 5-point scale from 1 (*0 times*) to 5 (*51 times or more*), and all items were summed to compute a total scale score (α = .923). Participants with no combat deployments were assigned a 0 scale score.

Analysis

Descriptive statistics, including frequencies and means, were calculated for all variables to assess response distribution. Group comparison tests, including Pearson chi-square tests and independent samples *t* tests, were used to conduct between-group comparisons for all variables. Bivariate and multivariate logistic regression analyses were then performed to assess predictors of follow-up substance use. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated for all variables. Variables statistically significant at the bivariate level were entered hierarchically into the multivariate model, with demographic and military service variables entered in the first step, baseline predictors entered in the second step, and follow-up predictors entered in the final step. Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 19.0 (IBM Corp., Armonk, NY).

Results

Of 742 participants reporting problem substance use at baseline, 312 (42.0%) also reported continued problem

TABLE 1. Descriptive characteristics of service members reporting problem substance use at baseline, stratified by problem substance use status at follow-up[a]

Variable	Substance use status at baseline (n = 742)	Substance use status at follow-up	
		Yes[b] (n = 312)	No (n = 430)
Service, n (%)			
USMC	463 (62.4)	197 (63.1)	266 (61.9)
USN	279 (37.6)	115 (36.9)	164 (38.1)
Marital status, n (%)			
Married/cohabitating	357 (48.2)	133 (42.6)	224 (52.3)
Unmarried	383 (51.3)	179 (57.4)**	204 (47.7)
Age in years, M (SD)	27.63 (7.59)	27.49 (7.3)	27.74 (7.79)
Combat deployments, n (%)			
0	114 (15.7)	51 (16.6)	63 (15.1)
1	189 (26.1)	76 (24.8)	113 (27.0)
≥2	422 (58.2)	180 (58.7)	242 (57.9)
Combat exposure,[c] M (SD)	20.90 (13.12)	22.04 (14.55)*	20.07 (11.91)
Months since leaving military, M (SD)	10.13 (4.92)	10.52 (5.65)*	9.52 (5.19)
Baseline characteristics			
PTSD,[d] M (SD)	39.44 (18.51)	42.95 (18.84)***	36.94 (17.87)
Limited general activities because of mental health concerns, n (%)			
0–3 days/month	590 (79.8)	232 (74.8)**	358 (83.4)
4–10 days/month	75 (10.1)	40 (12.9)*	35 (8.2)
11–30 days/month	74 (10.0)	38 (12.3)	36 (8.4)
Avoidant coping,[e] M (SD)	7.33 (2.07)	7.81 (2.04)***	6.98 (2.01)
Follow-up characteristics			
Limited general activities, n (%)			
0–3 days/month	590 (80.1)	219 (71.1)***	371 (86.5)
4–10 days/month	77 (10.4)	46 (14.9)	31 (7.2)
11–30 days/month	70 (9.5)	43 (14.0)***	27 (6.3)
Work stress,[f] M (SD)	5.90 (2.33)	6.33 (2.52)***	5.59 (2.13)
Family stress,[g] M (SD)	10.82 (3.32)	11.36 (3.67)***	10.43 (2.98
Trouble adjusting to civilian life? n (%)			
None	171 (23.7)	51 (16.7)***	120 (28.7)
A little	225 (31.1)	88 (28.9)	137 (32.8)
Some	230 (31.8)	110 (36.1)*	120 (28.7)
A lot	97 (13.4)	56 (18.4)***	41 (9.8)
PTSD,[d] M (SD)	37.71 (19.62)	43.82 (19.88)***	33.29 (18.22)
Postseparation social support range,[h] M (SD)	44.69 (8.49)	42.97 (8.32)***	45.93 (8.42)
Sensation seeking,[i] M (SD)	10.84 (3.38)	11.38 (3.24)***	10.45 (3.43)

Notes: USMC = United States Marine Corps; USN = United States Navy; PTSD = posttraumatic stress disorder. [a]Column totals may not equal 100% because of missing data; [b]significance levels reflect comparison tests between participants with and without substance use at follow-up; [c]range: 0–85, higher scores indicate greater exposure; [d]range: 17–85, higher scores indicate greater symptoms; [e]range: 3–12, higher scores indicate more frequent use of avoidant coping strategies; [f]range: 4–16, higher scores indicate more stress; [g]range: 8–32, higher scores indicate more stress; [h]range: 12–60, higher scores indicate more support; [i]range: 4–16; higher scores indicate more sensation seeking behaviors.
*$p \leq .05$; **$p \leq .010$;***$p \leq .001$.

substance use at follow-up ("persistors"). Table 1 includes descriptive statistics by study group for all study variables. The majority of participants (62.4%) were Marines, had two or more combat deployments (58.2%), and had been deployed within the past year (68.2%). A slight majority reported being unmarried (51.3%). The mean age was 27.6 years (SD = 7.59). On average, participants had been separated for 10 months (M = 10.13, SD = 4.9) at follow-up. Marines and Navy personnel did not differ in number of combat deployments. Marines had significantly higher substance use scores at baseline and follow-up (Table 1) and PTSD scores at baseline (M = 42.5 and 34.22, respectively), $t(736) = 6.0$, $p < .0001$, and follow-up (M = 39.9 and 33.9 respectively), $t(710) = 4.0$, $p < .0001$, than did Navy participants.

External validity of substance use categories

Persistors reported more trouble adjusting to civilian life; only 16.7% of persistors reported trouble-free adjustment compared with 28.7% of decreasers, $\chi^2(1, n = 723) = 14.0$, $p < .001$. More than half (52.3%) of persistors reported driving a vehicle while intoxicated in the time since separation compared with 16% of decreasers, $\chi^2(1, n = 725) = 108.3$, $p < .001$ (data not shown). Nearly one fifth (18.0%) of persistors,

TABLE 2. Bivariate and multivariate logistic regression examining predictors of follow-up problem substance use

Variable	Bivariate OR [95% CI]	Multivariate OR [95% CI]
Marital status		
Married/cohabitating	1.0	1.0
Unmarried	1.48** [1.10, 1.98]	1.25 [0.87, 1.80]
Combat exposure	1.0	1.0
	1.023** [1.01, 1.04]	1.00 [0.99, 1.02]
Civilian life time (months)	1.05*** [1.02, 1.08]	1.04* [1.01, 1.08]
Baseline		
Limited general activities		
(0–3 days/month)	1.0	1.0
4–10 days/month	1.76* [1.09, 2.86]	1.08 [0.58, 2.00]
11–30 days/month	1.63* [1.0, 2.65]	1.01 [0.50, 1.99]
PTSD	1.02*** [1.02, 1.04]	0.99 [0.97, 1.00]
Avoidant coping	1.22*** [1.13, 1.32]	1.21*** [1.11, 1.33]
Follow-up		
Limited general activities		
(0–3 days/month)	1.0	1.0
4–10 days/month	2.51*** [1.55, 4.08]	1.57 [0.86, 2.88]
11–30 days/month	2.70*** [1.62, 4.49]	1.09 [0.53, 2.25]
Work stress	1.15*** [1.08, 1.22]	1.03 [0.94, 1.12]
Family stress	1.09*** [1.04, 1.14]	0.99 [0.93, 1.06]
PTSD	1.03*** [1.02, 1.04]	1.03*** [1.01, 1.04]
Postseparation social support	0.96*** [0.94, 0.98]	0.98 [0.96, 1.01]
Sensation seeking	1.086*** [1.04, 1.13]	1.07* [1.01, 1.12]

Notes: OR = odds ratio; CI = confidence interval; PTSD = posttraumatic stress disorder.
*$p \leq .05$; **$p \leq .010$;***$p \leq .001$.

compared with 6% of decreasers, reported that in the time since military separation they had lost their temper and hurt someone, $\chi^2(1, n = 714) = 24.02$, $p < .001$ (data not shown).

Bivariate regression results

Bivariate regression analyses revealed numerous significant predictors of follow-up problem substance use status (Table 2). Being unmarried, having greater combat exposure, and having more months since separation were associated with increases in risk of problem use. Regarding baseline predictors, higher avoidant coping scores and PTSD symptoms were significant predictors of continued problem use at follow-up. Every 1-unit change in avoidant coping (measured with a 12-point scale) and PTSD symptom scores (measured with a 68-point scale) increased the odds of continued substance use by 22% (OR = 1.22, 95% CI [1.13, 1.32] $p < .001$) and 2% (OR = 1.02, 95% CI [1.02, 1.04], $p < .001$), respectively. Persistors were nearly twice as likely to report at baseline a limitation in activities because of mental health occurring 4–10 days per month.

At follow-up, persistors were more than 2.5 times more likely to report a limitation in activities because of mental health for 4–10 and 11–30 days of the past month. For each 1-unit increase in work or family stress, the odds of continued substance use increased by 15% (OR = 1.15, 95% CI [1.08, 1.22], $p < .001$) and 9% (OR = 1.09, 95% CI [1.04, 1.14], $p <. 001$), respectively. The odds of continued problem use also increased as a function of PTSD symptom score and sensation seeking. Conversely, there was a significant inverse relationship between social support and follow-up problem use. All variables significant at the bivariate level were included in the multivariate model.

Multivariate regression results

Months of civilian reintegration time significantly predicted continued problem use. Avoidant coping at baseline was also predictive of continued problem use; for each 1-unit increase in the avoidant coping score, the odds of continued problem use increased by 21%. Follow-up PTSD symptom score and greater sensation seeking increased the odds of problem use by 3% and 7%, respectively.

Discussion

As predicted, the majority of veterans (58%) who screened positive for problem alcohol and/or other substance use during active duty no longer screened positive in the year after separation from the military. We hypothesized that the concept of "transitioning out" for veterans may complement the concept of "maturing out" from civilian literature in helping to explain this decreased rate. Specifically, problem use of alcohol may be developmentally normative for young service members on U.S. bases. That alcohol is inexpensive and easily available on U.S. bases may further contribute to

high levels of problem use. However, many veterans move away from problem use as they transition to civilian lives and responsibilities in domains where drinking is no longer normative, including civilian careers and parenthood. Those who persisted in problem use were also more likely to report aggressive behavior, driving while intoxicated, and trouble adjusting to civilian life. The overall greater risk profile of the persistor group and the literature on physical, emotional, social, and functional problems associated with ongoing alcohol/other substance use highlight the need for prevention and treatment efforts.

The present study examined risk factors identified in previous studies for their ability to predict whether personnel separating from the military were at risk for continued substance use problems after separation. A number of preseparation variables emerged as significant predictors in univariate analyses. These included PTSD symptoms, limitations because of mental health, and avoidant coping, all of which are potential targets for intervention. PTSD is a treatable disorder with several available evidence-based treatments such as prolonged-exposure therapy and cognitive-processing therapy (IOM, 2008). Reductions in mental health symptoms are associated with fewer limitations because of mental health (Hides et al., 2011); thus, treatment for PTSD could also help reduce risk because of mental health limitations.

Several studies have evaluated whether interventions that primarily target coping skills are effective to reduce substance use. Carroll and colleagues (1998, 2000) compared cognitive behavioral coping skills training with 12-step facilitation and did not find coping skills training to have significantly better outcomes on abstinence from either alcohol or cocaine. Hien and colleagues (2004, 2009) evaluated Seeking Safety (Najavits, 2002), a cognitive behavioral therapy designed to improve coping among individuals with both PTSD and a substance use disorder, in two clinical trials. They did not find the therapy to be more effective than treatment as usual, relapse prevention, or health education over their follow-up periods (Hien et al., 2004, 2009). In a nonveteran sample, Hasking and colleagues (2011) found that alcohol expectancies partially mediated the relationship between negative coping and drinking behavior. Interventions targeting mechanisms associated with avoidant coping, such as expectancies, may prove more helpful than directly targeting avoidant coping. Examining whether avoidant coping can be reduced through PTSD treatment that targets trauma-related avoidance would also be of interest given the correlation between substance use and PTSD in the present sample. The relationship between sociocognitive variables such as coping and drinking appears to be very complex, with multiple factors likely playing a role (e.g., Hasking and Oei, 2004). Military experiences may further add to this complexity. More work is needed to understand the best way to reduce long-term substance use problems in military personnel.

The IOM report (2012) on substance use in the military recommended that the DoD enact prevention and early intervention efforts. Our findings showed that just over 40% continued problem use following military separation, which further highlights the need for large-scale prevention efforts. The IOM also suggested screening for substance use in primary care and other settings to enact selective and indicated prevention efforts for those with emergent problems. This study helped to identify factors at the time of military service that increase risk for continued problem use after separation. Screening for such risk factors in addition to substance use can help to identify individuals appropriate for targeted prevention efforts. The report also recommended that the DoD further disseminate evidence-based treatments for substance use and other co-occurring mental health conditions. Our finding that PTSD symptoms were among the risk factors for ongoing use supports this recommendation. The IOM proposed stronger coordination between DoD and Veterans Affairs. Our findings also support this recommendation as individuals at risk for continued problem use were also at risk for other behavioral and mental health problems.

Postseparation risk factors were also identified through univariate analyses. As hypothesized, these included PTSD symptoms and stress following separation. Interventions to help veterans reduce or effectively manage work and family stress and to improve social support may also be helpful in the reintegration period. Although sensation seeking is likely not a modifiable factor, strategies to help individuals channel sensation-seeking traits in healthy, prosocial ways should be explored.

PTSD symptoms, sensation seeking, and avoidant coping each explained significant variability in a multivariate model to predict persistent alcohol or other substance use. Avoidant coping explained the largest amount of variance in the model (22%). Hasking et al. (2011) showed that avoidant coping was related to expectations that alcohol would increase confidence and reduce tension. The first year after separating from the military is challenging for many veterans as they work to reintegrate into civilian life. For those who expect alcohol to boost confidence or relaxation, the reintegration year may be a crucial branching point for continued alcohol or other substance use trajectories. In addition, avoidant coping strategies may interfere with treatment for mental health problems. For example, Berking et al. (2011) showed that those relying on avoidant coping drank the most after cognitive behavioral therapy for alcohol dependence, suggesting that this style of coping may have a negative effect on treatment outcome.

Limitations of this study include that only 25% of the baseline sample responded to the follow-up survey, raising the question of whether the sample was representative. However, as noted, this is a conservative estimate of the response rate. Although the TICS has strong sensitivity and specificity to alcohol and other substance use disorders, it is a coarse measure consisting of only two items. Because the

items ask about both alcohol and other substance use, it was not possible to tease apart what percentage of the sample has problems with only alcohol, only other substance use, or both. As the IOM (2012) report showed, patterns of alcohol use among younger and older military personnel may differ from patterns of other substance use such as prescription drugs. It would be informative to investigate whether personnel who had been discharged because of injury or disability were more likely to continue problem alcohol or other substance abuse. We were unable to do this because such individuals constituted only 3% of the sample. Much of the literature on maturing out has been with alcohol as opposed to other substances. Thus, it is important that future studies assess predictors of problem use of specific substances. Another limitation was that avoidant coping was measured with a three-item scale. A more comprehensive scale may have offered more nuanced information regarding avoidant coping. Unfortunately, data regarding treatment seeking following discharge were not collected, so whether treatment was associated with lower likelihood of continuing substance use is not known. That only two branches of the military (Marines and Navy) were represented limits generalizability of the findings to other branches of the DoD. The Army has been shown to have the highest rates of drinking of all military branches (IOM, 2012); therefore, including army personnel would be important in future studies. Our findings were consistent with national data showing that Marines have higher rates of both drinking (25% compared with 17% heavy drinking; IOM, 2012) and PTSD (9% compared with 4%; Blakeley and Jansen, 2013) than do Navy personnel.

Although a large number of recently separated veterans reported that they cease to engage in problem use of alcohol and other substances following separation from the military, a significant proportion reported persistent problem use. Those who continue are at risk for a host of psychological, physical, social, and functional problems. This study identified several risk factors for continued problem use, some of which, such as avoidant coping and mental health problems, are potentially modifiable through intervention. Future research is needed to further understand risk and protective factors and evaluate how to best use such knowledge in prevention and intervention efforts.

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14. ABSTRACT
Objective: The goals of the present study were to (a) examine change in rates of problem alcohol/substance use among a sample of veterans between their last year of military service and their first year following separation, (b) identify predictors of continued problem use in the first year after separation, and (c) evaluate the hypothesis that avoidant coping, posttraumatic stress disorder (PTSD) symptoms, and chronic stress place individuals at particularly high risk for continued problem use.

Method: Participants (*N* = 1,599) completed self-report measures before and during the year following separation. Participants who endorsed either having used more than intended or wanting or needing to cut down during the past year were considered to have problem use.

Results: Of 742 participants reporting problem substance use at baseline, 42% reported continued problem substance use at follow-up ("persistors"). Persistors reported more trouble adjusting to civilian life, had a greater likelihood of driving while intoxicated, and had a greater likelihood of aggression. Multivariate analyses showed that avoidant coping score at baseline and higher PTSD symptom score and greater sensation seeking at follow up predicted continued problem use.

Conclusions: Understanding risk factors for continued problem use is a prerequisite for targeted prevention of chronic problems and associated negative life consequences.

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